

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:
a semiconductor substrate;
5 a high-dielectric-constant film on the semiconductor substrate; and
a nitride layer on the high-dielectric-constant film.

10 2. The semiconductor device according to claim 1 further comprising a p-type impurity-contained layer on the nitride layer.

15 3. The semiconductor device according to claim 1 wherein the nitride layer is formed by introducing nitrogen into a top surface portion of the high-dielectric-constant film.

20 4. The semiconductor device according to claim 1 wherein the semiconductor substrate is a silicon substrate or a silicon layer.

25 5. The semiconductor device according to claim 2 wherein the p-type impurity-contained layer is a boron-contained silicon layer.

6. A method of manufacturing a semiconductor

device comprising the steps of:

forming a high-dielectric-constant film on a semiconductor substrate; and

forming a nitride layer over the top surface
5 of the high-dielectric-constant film.

7. The method according to claim 6 further comprising the step of forming a p-type impurity-contained layer on the nitride layer.

10 8. The method according to claim 6 wherein the nitride layer is formed by introducing nitrogen into a top surface portion of the high-dielectric-constant film.

15 9. The method according to claim 6 wherein the nitride layer is formed by introducing nitrogen into the top surface portion of the high-dielectric-constant film by plasma nitriding.

20 10. The method according to claim 6 wherein the nitride layer is formed by introducing nitrogen into the surface portion of the high-dielectric-constant film by using radical nitrogen.

25 11. The method according to claim 6 wherein the semiconductor substrate is a silicon substrate or a

silicon layer.

12. The method according to claim 7 wherein
the p-type impurity-contained layer is a boron-
5 contained silicon layer.

13. A semiconductor device comprising:
A semiconductor substrate;
a gate insulating film on the semiconductor
10 substrate; and

a gate electrode formed on the gate
insulating film and including at least a p-type
impurity-contained layer,

wherein the gate insulating film includes a
15 high-dielectric-constant film and a nitride layer on
the high-dielectric-constant film.

14. The semiconductor device according to
claim 13 wherein the nitride layer is formed by
20 introducing nitrogen into a top surface portion of the
high-dielectric-constant film.

15. The semiconductor device according to
claim 13 wherein the semiconductor substrate is a
25 silicon substrate or a silicon layer.

16. The semiconductor device according to

claim 13 wherein the p-type impurity-contained layer is a boron-contained silicon layer.

17. A method of manufacturing a semiconductor device comprising the steps of:

forming a gate insulating film on a semiconductor substrate; and

forming a gate electrode including at least a p-type impurity-contained layer on the gate insulating film,

wherein the step of forming the gate insulating film includes a step of forming a high-dielectric-constant film on the semiconductor substrate, and a step of forming a nitride layer on the top surface of the high-dielectric-constant film.

18. The method according to claim 17 wherein the nitride layer is formed by introducing nitrogen into a top surface portion of the high-dielectric-constant film.

19. The method according to claim 17 wherein the nitride layer is formed by introducing nitrogen into the top surface portion of the high-dielectric-constant film by plasma nitriding.

20. The method according to claim 17 wherein

the nitride layer is formed by introducing nitrogen into the surface portion of the high-dielectric-constant film by using radical nitrogen.

5 21. The method according to claim 17 wherein the semiconductor substrate is a silicon substrate or a silicon layer.

10 22. The method according to claim 17 wherein the p-type impurity-contained layer is a boron-contained silicon layer.